Mikolit Sealing Pellets

The purity of undergroundwater is threatened in several ways by increasing pollution.
Clay layers, which were deposited by seas and rivers millions of years ago, form a natural almost waterproof barrier preventing possible pollution. They form, therefore, the ideal protection, created by nature itself, of the water containing sand layers.

However, in order to pump up groundwater for the drinking water supply, these protecting clay layers have to be drilled through. Also in the case of excavation work does one run the risk of disturbing such a clay layer. This causes "Leakages" and it gives pollution a chance to pollute the clean groundwater and make it unsuitable for drinking.

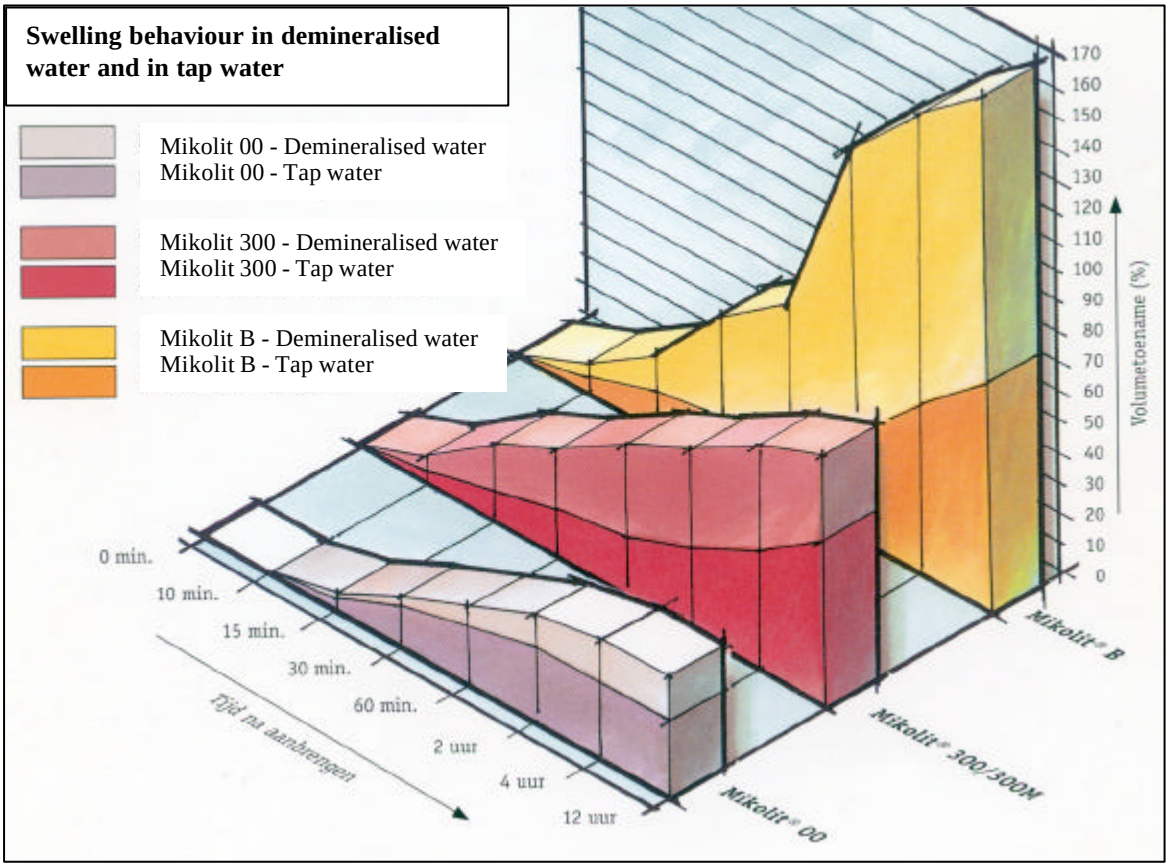
In the drilling business, more and more attention is being paid to restoring these clay layers and protecting the groundwater quality. This line of thinking is often motivated by far reaching legislation for drilling companies.

Mikolit sealing pellets are produced on a basis of clay and they are especially developed to restore, as naturally as possible, clay layers and other layers of soil that have been drilled through or otherwise damaged.

REQUIREMENTS AND WISHES REFLECTED IN MIKOLIT
What requirements should sealing material meet to be suitable for restoring clay layers? The main criteria are:

- Sealing ability
- Swelling strength
- Swelling behaviour
- Sinking speed
- Chemical and mineralogical reliability
- Simple and dust-free application

All these aspects are inseparable as there is not one measure for quality. For this reason, particular attention has been paid, while developing the sealing pellets, to an ideal combination of product characteristics; these, after all, determine the success of your repairs. Laboratory tests and many practical research were the basis for Mikolit. By now, Mikolit products are widely used in soil drilling: almost all certified drilling companies in the Netherlands use Mikolit as sealing material.



USES FOR MIKOLIT

Owing to their product characteristics, Mikolit sealing pellets are particularly used when a good sealing and filling up of the drill hole is necessary in the soil drilling business. Some known uses are:

- Sealing clay layers in pump pits, observation pits and return pits
- Placing clays balls in pulse drills
- Filling up drill holes for seismic research, well-painting filters etc.
- Filling up empty pump pits
- Placing impenetrable layers or walls at dumping sites or other polluted sites;
- Sealing openings in bentonite-cement walls
- Placing clay shuttering around underground pipes
- Making existing drills or pits that are too deep, less deep

MIKOLIT AND THE ENVIRONMENT

The clay is extracted from deep and dry pits in the Dutch-German border region which is not polluted by rivers. For using Mikolit in water collection activities, it has to meet strict environmental demands which of course apply here. These are supervised externally and they are laid down in a declaration of non-hazardousness. An independent research laboratory supervises whether Mikolit continues to meet the requirements of this certificate.

CHARACTERISTICS OF MIKOLIT

Mikolit sealing pellets consist, as the name indicates, of small rod shaped granules of clay. These granules are dry on the outside, but slightly damp inside. Because of this, the granule retains its shape, it is dust-free and easy to handle and it slowly absorbs the water added.

Because of the natural form that comes about during the production process, the granule quickly sinks to the layer which is to be sealed. While sinking, the granule does not lose its form nor traces of clay that could slow down the sinking pace considerably. Early swelling is prevented and thus unwanted balls of clay cannot be formed from accumulating granules sticking together (so-called **bridge formation**) in the water filled area between drilling wall and tube. This would prevent the granules from ever reaching the relevant layer and then there would be no sealing at all.

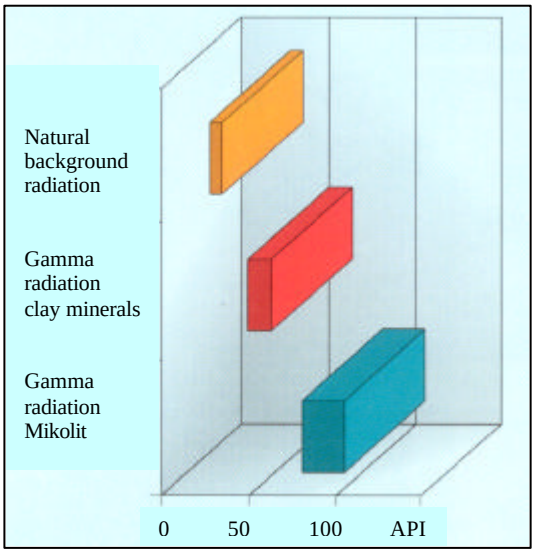
The clay used for Mikolit is known as "Brunssum clay". This Pliocene clay has a very fine and compact structure and it is pressed under high pressure into an especially plastic and relatively heavy granule. So, there is hardly any chance that the pellets form is changed and that bridge formation comes about. Then, the outside is dried, the granules are sifted, cooled and packed. There are two standard Mikolit qualities that can be supplied in various granule forms

Indicative consumption need of Mikolit

Buis/Tube/Tube/Rohr (ømm) \ Boorgat/Bore-hole/Forure/Bohrloch (ømm)	100	150	200	250	300	400	500	600
0	8	20	36	56	80	143	223	321
50	6	18	34	54	78	141	221	319
100		12	28	48	72	135	215	313
125			22	42	66	128	209	307
160			12	33	58	120	200	298
200				20	44	108	188	285
250					25	88	167	265
315						55	134	232
400							81	178
500								98

kg/m
(indicatief/indicative/indicatif/indiziert)

Gamma Radiation



	Mikolit®100	Mikolit®300	Mikolit®B
Description	Moderate swelling sealing pellet for basic swelling	The adding of bentonite results in a powerfully swelling sealing pellet, combining good sealing results with excellent application properties	Extremely powerful swelling because only pure bentonite is used. Thanks to the special production process, application properties remain good
Dimensions Standard length Standard diameter	 7 – 12 mm ± 6mm	 7 – 12 mm ± 6mm	 7 – 12 mm ± 6mm
Colour	Greyish brown	Greyish brown	Light olive
Size of the clay articles (DIN 18123) < 0,002 mm 0,002 – 0,006 mm > 0,006 mm	 53% 40% 7%	 56% 40% 4%	 71% 29% 0%
Water absorption capacity ENSLIN/NEFF (DIN 18 132) After 24 h After full swelling Course of water absorption After 1 h After 24 h After 48 h After 96 h	 80% 100%	 160% 240%	 350% 800% 190% 150% 650% 800%
Water impermeatibility Kf-value (DIN 18 130)	 $<10^{-10}$ m/s	 $< 10^{-11}$ m/s	 $< 10^{-12}$ m/s
Swelling capacity Free swelling in demineralised water, 1 litre beaker, pore volume included **Course of swelling** Initiated after After 1 h After 24 h After 48 h	 50 – 60% 15 min 15% 35% 50%	 100 – 120% 15 min 15% 45% 90%	 250 – 280% 15 min 20% 200% 250%
Moisture content DIN 18121 **Swelling pressure**	 < 15% 3,5 kN/ m^3	 < 15% 13,0 kN/ m^3	 < 20% 15,0 kN/ m^3
Mineralogical main structure (RDA/IR) DIN 51001 Kaolinite Illite/Glimmer Illite-smectite Smectite Quartz Other **Chemical main structure** (RFA) SiO_2 Al_2O_3 Fe_2O_3 Other	 15-20% 15-205 10-155 10-15% 25-30% 5-10% 72% 18% 2% 8%	 15-20% 15-20% 15-20% 20-25% 15-20% 5-10% 70% 20% 2% 8%	 20-30% 60-70% 5-10% 5-10% 63% 21% 11% 5%
Glowing loss (DIN 18 128, 550°C)	9%	7%	5%
g-radiation (Gamma Ray Log)	80-105 API	80-105 API	80-100 API
Bulk weight	1,1 t/m^3	1,1 t/m^3	1,0 t/m^3
Density of the pellet	2 t/m^3	2 t/m^3	1,9 t/m^3
Specific weight of the clay	2,6 t/m^3	2,6 t/m^3	2,6 t/m^3
Sinking speed in water	21 m/min	21 m/min	21 m/min